

Assessment of Associations between Physical-related Quality of Life and Early Signs of Comorbidities in HIV-positive Subjects enrolled in the HIV UPBEAT (Understanding the Pathology of Bone Disease in HIV Infected Subjects) Study

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Background

In a previous analysis of the HIV UPBEAT cohort, a prospective cohort of HIV-positive and HIV-negative subjects from similar demographic backgrounds, we analysed overall self-reported quality of life (QoL) plus physical and mental components scores using the MOS-HIV Health Survey. The HIV-positive group reported lower QoL compared to the HIV-negative group with the lowest scores reported for general health and vitality. Here, we explore associations of physical-related QoL (Ph-QoL) with early signs of comorbidities in HIV-positive subjects.

Methods

HIV-positive UPBEAT participants were stratified into 4 equally-sized groups based on the quartiles of the distribution of baseline Ph-QoL. Surrogate markers of bone, renal and cardiovascular disease were investigated including: bone mineral density (BMD) assessments at femoral neck (FN), total hip (TH) and lumbar spine (LS), total and tubular proteinuria using the protein:creatinine ratio (P/Cr) and the retinol binding protein:creatinine ratio (RBP/Cr), and estimation of 10 year risk of atherosclerotic cardiovascular disease (ASCVD-10y). Between-group comparisons were assessed using Kruskal-Wallis/Chi-square tests with confounder-adjusted analyses performed using multivariable regression models.

Results

In 167 HIV-positive subjects, the quartiles defining the 4 groups of Ph-QoL were 70.7, 83.9 and 90.6, respectively. Group 1 was, on average, 2 years older than the other groups, with higher proportions of Caucasians, current smokers and those of lower socio-economic status (Table 1). Whilst Group 1 had lower CD4-cell count, there were no differences in years since HIV diagnosis or receipt of antiretroviral treatment. BMD dropped as Ph-QoL decreased at all 3 sites whereas RBP/Cr and ASCVD-10y risk increased. After adjustment for demographic/socio-economic factors, smoking status, CD4-cell count and fractures, BMD at the 3 sites and ASCVD-10y remained significantly associated with Ph-QoL but the renal markers did not. The absolute BMD at FN decreased by 0.033 g/cm² (95%CI: 0.012, 0.054), p=0.002) as the Ph-QoL quartile decreased by 1 group, with similar decreases for BMD_LS (95%CI: 0.006, 0.053), p=0.015) and BMD_TH (95%CI: 0.008, 0.049), p=0.008). In addition, ASCVD-10y risk score increased by 0.844 (95%CI: -1.653, -0.035), p=0.04) per lower Ph-QoL group.

Conclusion

Lower self-reported physical function was associated with worse surrogates for bone and cardiovascular health after controlling for traditional risk factors such as age, smoking, previous fractures and HIV-related parameters. Although these data are derived from an observational study where the direction of causation cannot be inferred, our results indicate that the MOS-HIV questionnaire is a useful tool in detecting early signs of comorbidities in PLWH.

Table 1. Cardiovascular, renal and bone variables stratified by Ph-QoL quartiles

Median (IQR)	1 st Quartile Ph-QoL<70.7 (N=42)	2 nd Quartile 70.7<Ph-QoL<83.9 (N=41)	3 rd Quartile 83.9<Ph-QoL<90.6 N=(42)	4 th Quartile Ph-QoL>90.6 (N=42)	P value
Age (years)	41 (34, 51)	39 (33, 46)	37 (33, 43)	39 (34, 46)	0.36
Male, n (%)	23 (55)	28 (68)	29 (69)	21 (50)	0.18
Caucasian, n (%)	31 (74)	25 (61)	19 (45)	22 (52)	0.34
Current Smoking, n (%)	25 (60)	15 (37)	12 (29)	16 (38)	0.03
Income<€575/week, n (%)	37 (88)	32 (78)	35 (83)	35 (83)	0.68
<3 rd Educ. Level, n (%)	21 (55)	20 (51)	19 (46)	17 (40)	0.58
Previous Fractures, n (%)	14 (33)	13 (32)	13 (31)	17 (41)	0.78
CD4+ T (cells/mm ³)	433 (348, 643)	541 (376, 748)	445 (350, 548)	520 (372, 676)	0.12
BMD-FN (g/cm ²)	0.93 (0.84, 1.02)	1.02 (0.93, 1.10)	1.06 (0.97, 1.22)	1.04 (0.93, 1.14)	0.0001
BMD-LS (g/cm ²)	1.12 (1.03, 1.24)	1.15 (1.05, 1.27)	1.17 (1.07, 1.28)	1.21 (1.09, 1.35)	0.07
BMD-TH (g/cm ²)	0.95 (0.88, 1.06)	1.06 (0.94, 1.16)	1.07 (0.97, 1.20)	1.05 (0.95, 1.16)	0.001
RBP/Cr (µg/g)	130.0 (70.7, 255.2)	102.7 (72.6, 180.0)	83.6 (42.9, 117.8)	91.6 (66.3, 139.8)	0.08
P/Cr (mg/mmol)	9.7 (6.7, 16.1)	8.3 (6.6, 13.4)	8.7 (7.0, 15.8)	8.4 (6.2, 13.9)	0.72
ASCVD-10y risk	9.2 (3.7, 15.6)	2.8 (1.4, 5.8)	4.0 (2.6, 7.5)	2.3 (0.65, 7.8)	0.014